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United States  
Department of  
Agriculture

Soil  
Conservation  
Service

Bozeman,  
Montana

# Montana Water Supply Outlook



June 1, 1987



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## Foreword

### How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall. This snowfall accumulates high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are viewed in conjunction with snowpack data to prepare runoff forecasts. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data and narratives describing current conditions.

Streamflow forecasts are cooperatively generated by Soil Conservation Service and National Weather Service hydrologists. Forecasts become more accurate as more data affecting runoff becomes known. For this reason, forecasts are issued that reflect three future precipitation conditions — Below Normal, Average, and Above Normal. These forecasts are termed reasonable minimum, most probable, and reasonable maximum. Actual streamflow can be expected to fall between the lower and upper forecast values eight out of ten years.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation, temperature, and other parameters are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

### For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. Because of the limited space, snow survey measurements are not published in monthly reports. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola, Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Denver, CO 80211
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 97102
Idaho	304 North 8th Street, Room 345, Boise, ID 83702
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97208
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	360 U.S. Court House, Spokane, WA 99201
Wyoming	Federal Building, 100 East "B" Street, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 547, Portland, OR 97209.

Published by other agencies:

Water Supply Outlook Reports prepared by other agencies include: California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A 3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.



# Montana Water Supply Outlook

and

## Federal – State – Private Cooperative Snow Surveys

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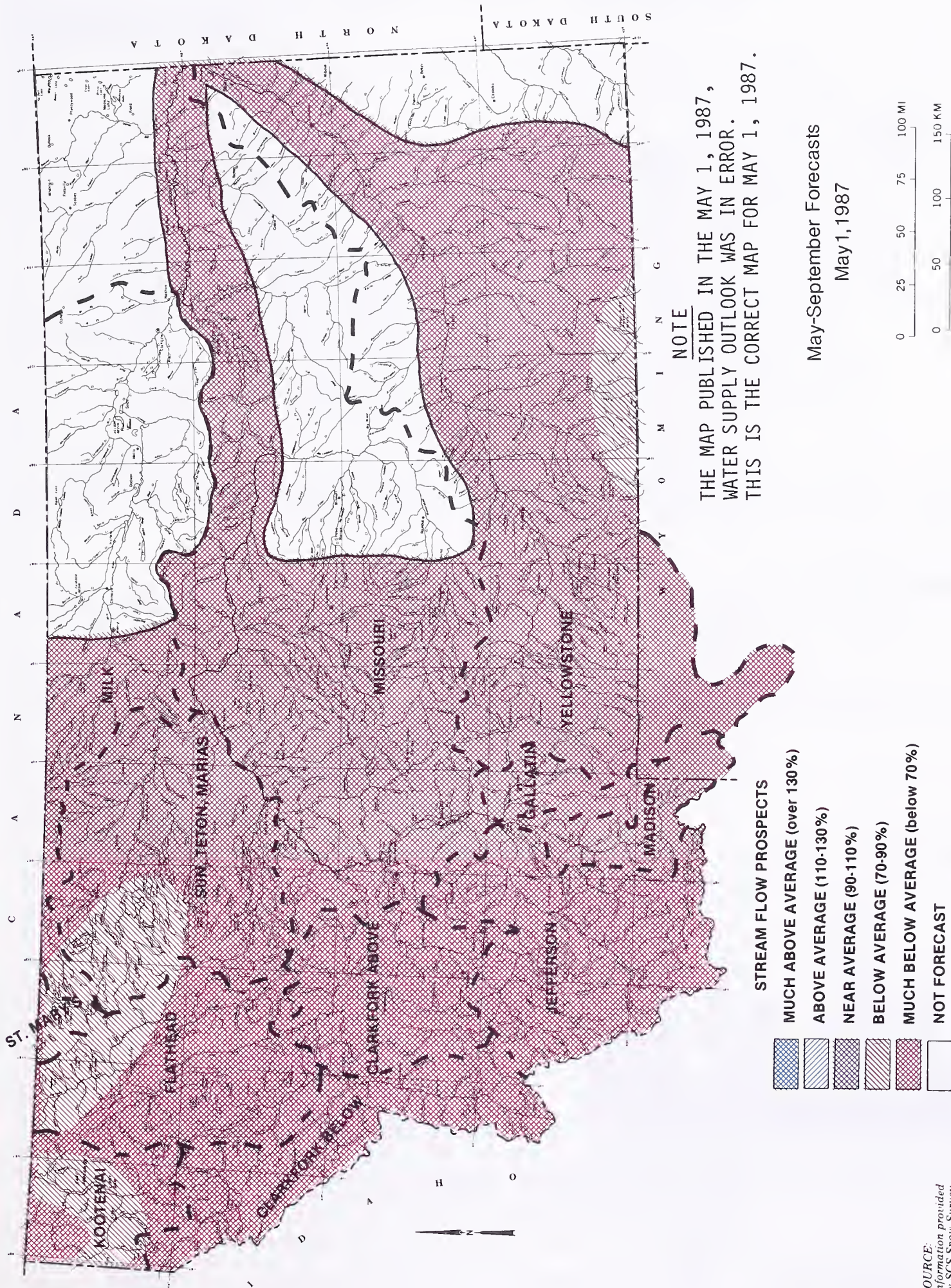
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# STREAMFLOW PROSPECTS FOR MONTANA

## Spring and Summer Period





## GENERAL OUTLOOK

### SUMMARY:

Warm temperatures with little rain persisted through the first half of May, depleting the already diminished snowpack. Irrigation demands were very high for this early date. The last half of May saw a return to more normal weather. Cooler temperatures and heavy precipitation was reported over most of Montana. The northwestern corner did not receive as much and finished the month with below average totals. Most of the state reported totals of average or above average moisture for the month. For the majority of the southern drainages, this was the first month since November having near or above average mountain precipitation. Streamflows are expected to be near the volumes forecasted on May 1 over most of the state. Irrigation water shortages are expected to become widespread by late June and continue through most of the summer.

### SNOWPACK:

The only significant snowpack remaining at measuring sites exists in the Kootenai, Flathead and St. Mary River drainages. Here the snowpacks are about 20 to 30 percent of average. All other basins have very little snowpack remaining. Most have less than 5 percent of the normal June 1 snowpack. During recent storms, some snowfall occurred at higher elevations but did not provide much of an increase to the snowpack.

### PRECIPITATION:

Mountain precipitation was near or above average in all areas except northwest Montana. Heaviest amounts were east of the Divide. Most of the month's moisture fell in the last two weeks. In most basins, this was the first month since November where the precipitation amounts were near or above average. The moisture that fell improved soil moisture levels and reduced irrigation demands.

### RESERVOIRS:

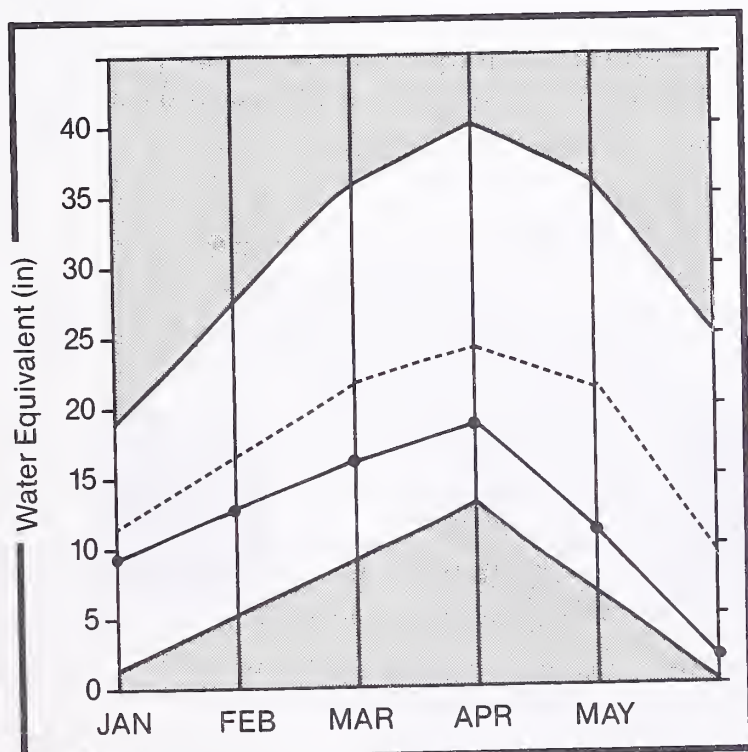
Early irrigation demands resulted in some use of stored water in early May. Rainfall along with reduced irrigation demand increased inflows and slowed reservoir releases in late May. Most reservoirs are full or nearly full. However, the few that are not full may not fill this year.

# STREAMFLOW:

May runoff was near average in the Flathead, Kootenai, St. Mary and Upper Yellowstone River tributaries. All other areas had below average runoff due in part to lack of snowmelt contribution. Also, irrigation withdrawals were much greater than normal for May. Some streams had increased runoff with the rain but all areas except for the Yellowstone had peak flow of the season in early May during the snowmelt peak. Streamflows are expected to be about the same as forecasted on May 1 for most drainages. In the northwest area runoff could be a little less while the southwest, south central and central areas may have a little more runoff than previously forecast. Most areas are still expected to have shortages of irrigation water by late June. This condition will continue for most of the summer.

## Kootenai Basin

Mountain snowpack\* (inches)



\*Kootenai in Montana

Maximum



Minimum



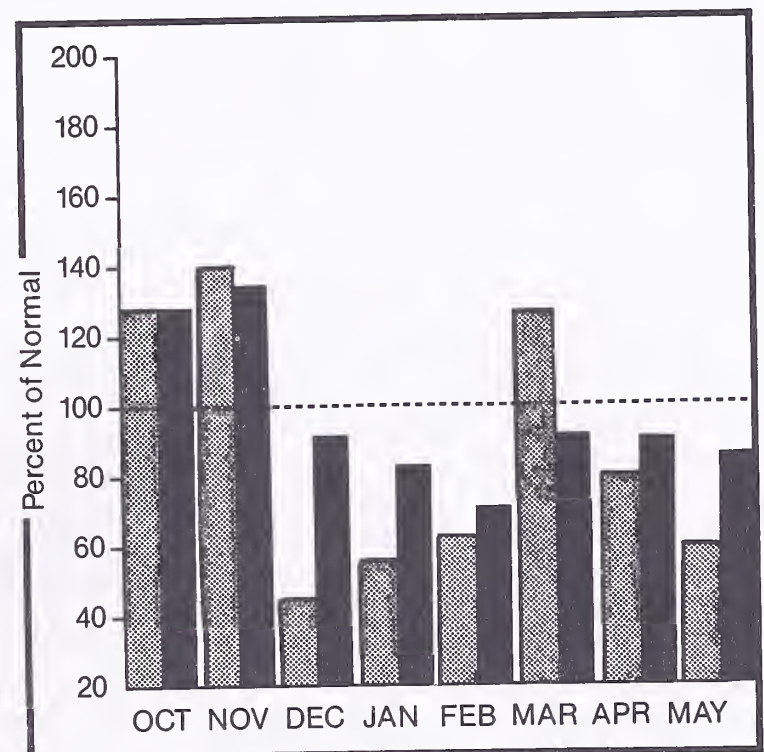
Average



Current



Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation



Year to date precipitation



## KOOTENAI RIVER BASIN in Montana

### WATER SUPPLY OUTLOOK:

The snowpack continues to decline earlier than normal and is now about 20 percent of average water content for this time of year. Cooler weather in late May has slowed the snowmelt at those sites still having snow. Precipitation in the mountains has been only about one-half of average for May. Runoff in May was a little above average on the Kootenai River. Streamflows are still forecast to be below average on all drainages with volumes expected to be a little less than the forecasted volumes issued on May 1.

For more information contact your local Soil Conservation Service office.

## KOOTENAI RIVER BASIN in Montana

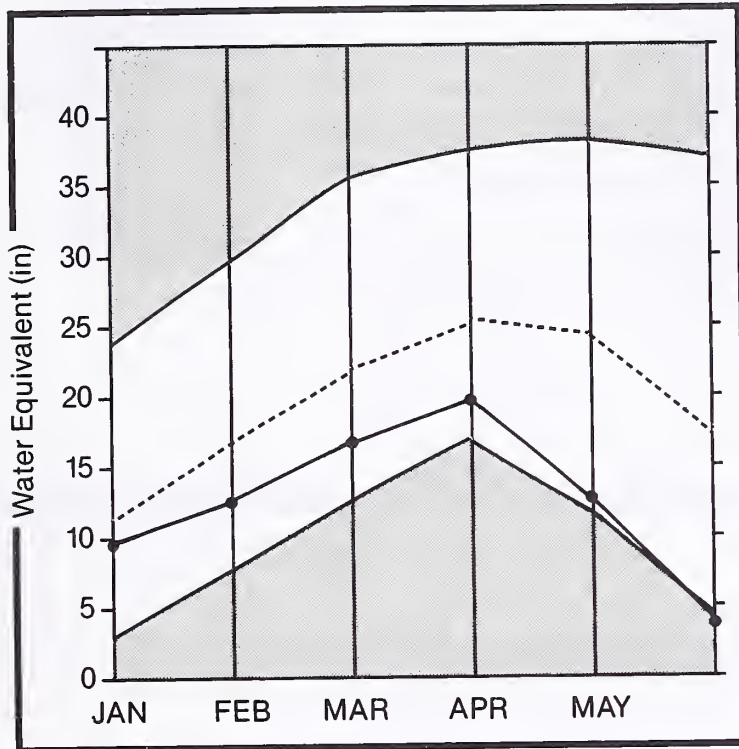
RESERVOIR STORAGE					(1000AF)	WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF		
		THIS YEAR	LAST YEAR	AVG.			LAST YR.	AVERAGE	
LAKE KOOCANUSA	5748.0	4553.0	4106.0	3183.0	EAST KOOTENAI in B.C.	8	12	9	
					KOOTENAI in MONTANA	17	37	21	
					KOOTENAI ab BONNERS FERRY	24	23	15	

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
 2 - Corrected for upstream diversions or changes in reservoir storage.  
 The average is computed for the 1961-85 base period.



# Flathead Basin

**Mountain snowpack\* (inches)**



\*Flathead

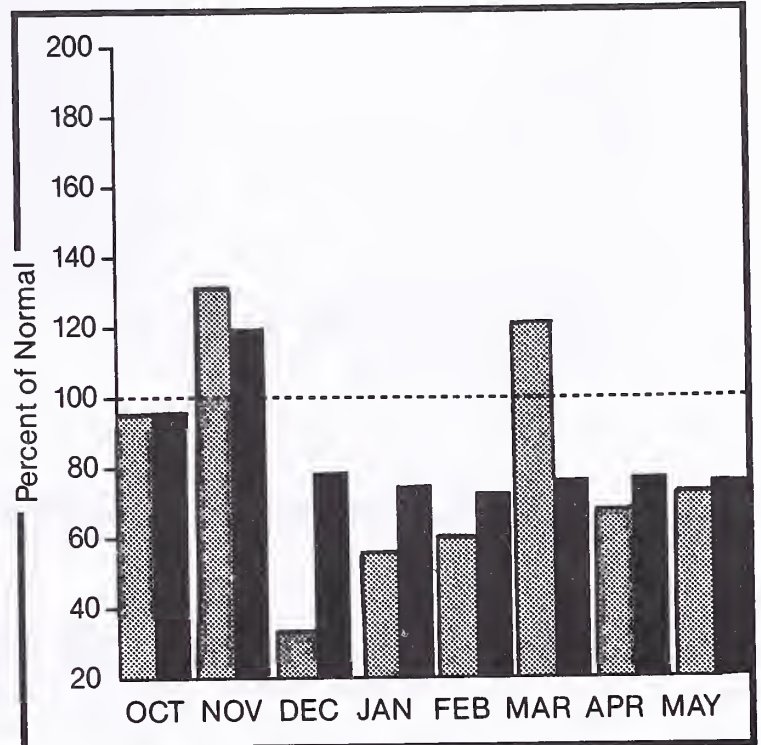
Maximum

Average

Minimum

Current

**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation

Year to date precipitation

## WATER SUPPLY OUTLOOK:

Snowpacks are quite low due to earlier than normal melt this spring and below average mountain moisture for the winter. Currently, water content in the remaining snowpack is about 20 percent of the amount usually remaining at this time of year. Snow is better in the northern drainages than in southern areas. Streamflows are expected to be a little less than those indicated by the May 1 forecast. During May, the runoff was a little below average. Peak runoff occurred on most streams in early May. Irrigation shortages for streams not having stored water is still expected to develop by mid-June.

For more information contact your local Soil Conservation Service office.

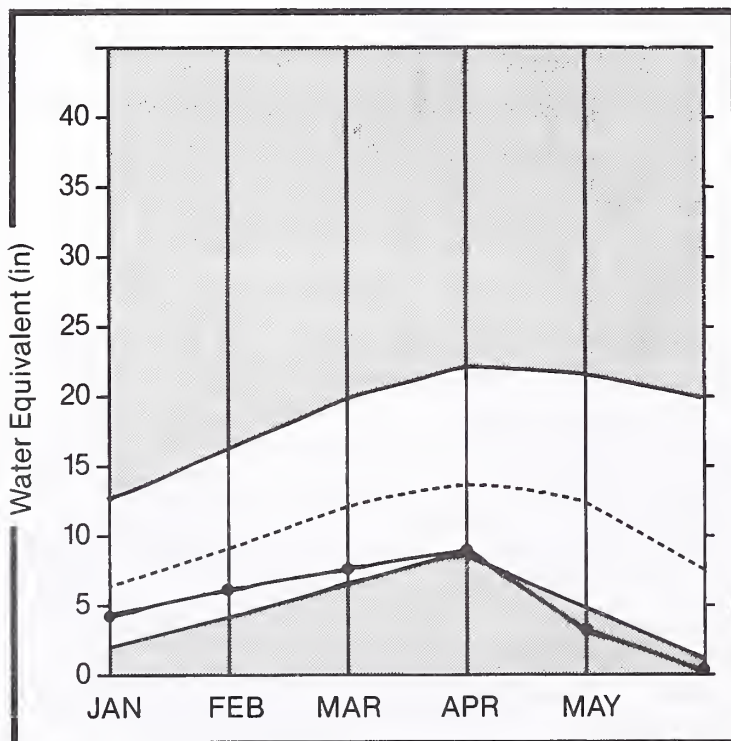
# FLATHEAD RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	USEABLE STORAGE THIS YEAR	USEABLE STORAGE LAST YEAR	USEABLE STORAGE AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
CAMAS (4)	45.2	31.4	37.3	31.3	NORTH FORK FLATHEAD	11	39 29
MISSION VALLEY (8)	100.0	62.2	95.0	67.9	MIDDLE FORK FLATHEAD	5	30 20
HUNGRY HORSE	3451.0	3264.0	2230.0	2663.0	SOUTH FORK FLATHEAD	5	18 12
FLATHEAD LAKE	1791.0	1596.0	1568.0	1468.0	STILLWATER-WHITEFISH	5	31 16
					SWAN	6	22 15
					LITTLE BITTERROOT	2	0 0
					FLATHEAD	23	29 20

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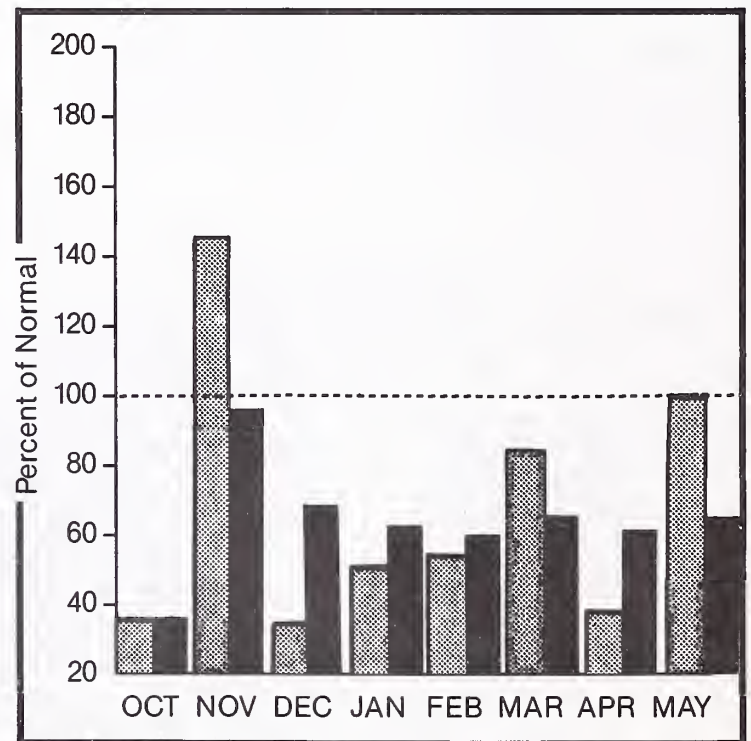
## Clark Fork Basin above Missoula

Mountain snowpack\* (inches)



\*Clark Fork above Missoula

Precipitation\* (percent of normal)



\*Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation





## CLARK FORK RIVER BASIN above Missoula

### WATER SUPPLY OUTLOOK:

Snow has melted from nearly all the snow measuring sites. Mountain precipitation was near average for May. Streamflows increased with the rainfall and reduced irrigation demands. However with the lack of snowmelt, the May runoff was only about one-half of average. Some streams showed increased flow near the end of May but did not reach the snowmelt peaks recorded in early May. Streamflows are expected to be near volumes forecasted on May 1. Depending on rainfall, irrigation water shortages are expected to develop as soon as temperatures warm and will probably continue through much of the summer.

For more information contact your local Soil Conservation Service office.

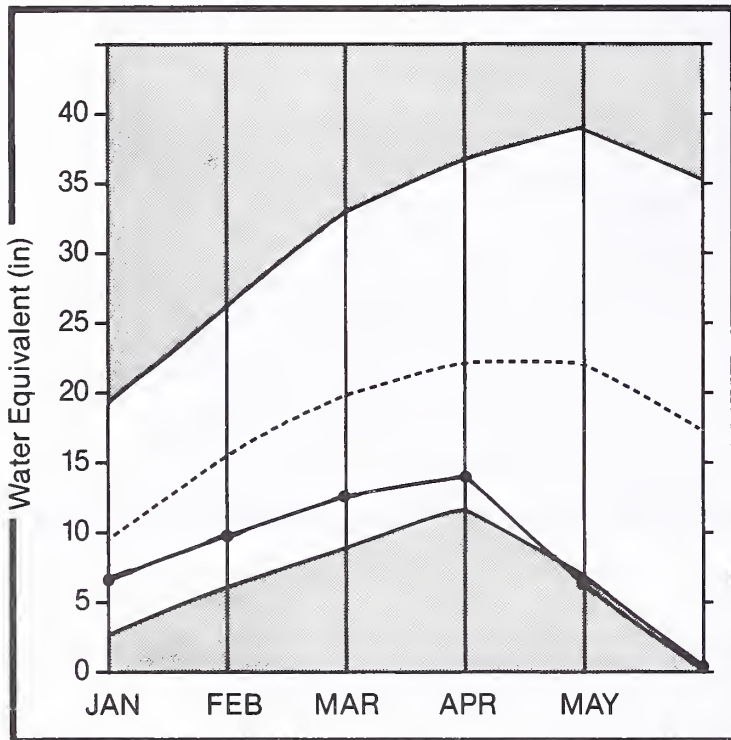
### CLARK FORK RIVER BASIN above Missoula

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
GEORGETOWN LAKE	31.0	30.6	29.1	26.5	CLARK FORK ab BLACKFOOT	14	0 0
LOWER WILLOW CREEK	4.9	2.4	5.0	4.5	BLACKFOOT	6	8 1
NEVADA CREEK	12.6	6.0	12.8	11.6	CLARK FORK above MISSOULA	18	1 1

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
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 The average is computed for the 1961-85 base period.

# Clark Fork Basin below Missoula

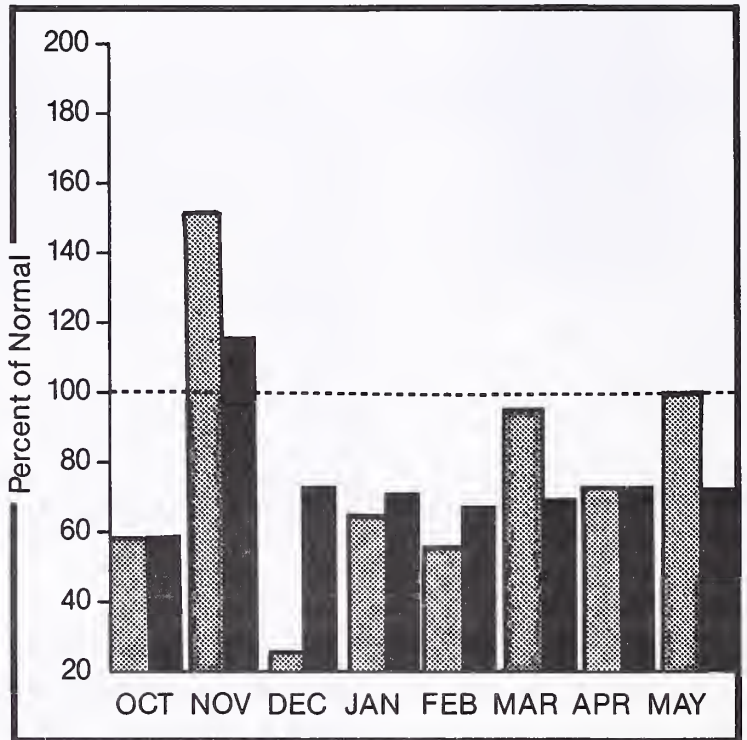
Mountain snowpack\* (inches)



\*Bitterroot

Maximum Average   
Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation

## WATER SUPPLY OUTLOOK:

Snow measuring sites have very little snow remaining. During May, mountain precipitation was near average at most locations with most of it coming in the last part of the month. This has helped reduce the irrigation water demand and increase streamflows. However, runoff during May was only 50 to 60 percent of average due to the lack of snowmelt contribution. Some streamflows picked up during the recent rainfall but did not reach levels recorded during peak snowmelt runoff in early May. Streamflow forecasts are expected to be similar to those issued on May 1. Shortages of irrigation water are still anticipated to develop in the next month and continue through the summer.

For more information contact your local Soil Conservation Service office.



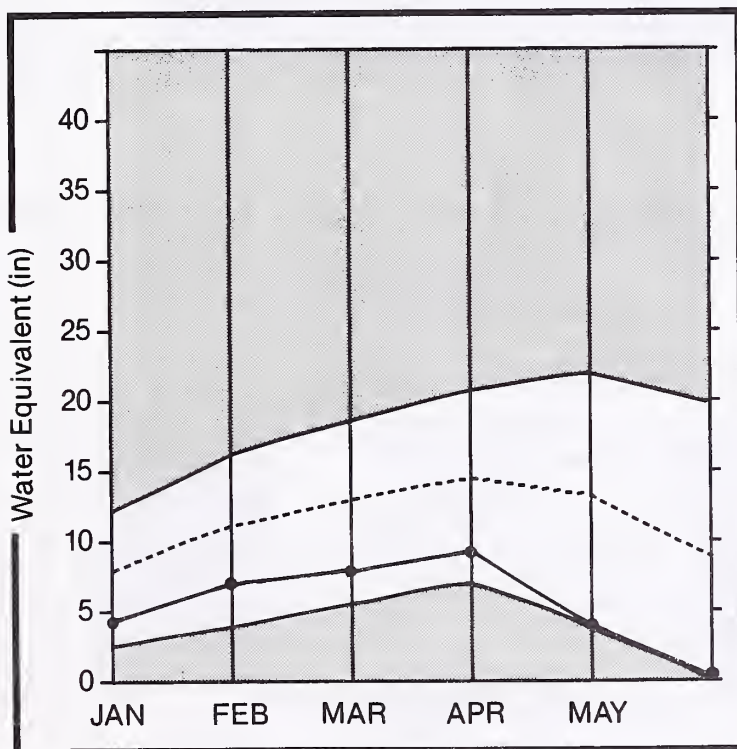
# CLARK FORK RIVER BASIN below Missoula

RESERVOIR STORAGE					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF	
		THIS YEAR	LAST YEAR	AVG.			LAST YR.	AVERAGE
FAINTED ROCKS LAKE	31.7	24.7	---	30.4	CLARK FORK above MISSOULA	18	1	1
NOXON RAPIDS	335.0	328.0	333.0	270.4	BITTERROOT	11	1	1
COMO	34.9	31.4	35.4	28.2	LWR CLARK FK b/w MISSOULA	13	14	6
					BITTERROOT & LWR C.F.	23	9	4
					CLARK FORK TOTAL	39	7	3
					FLATHEAD	23	29	20
					FEND O'REILLE	58	20	12

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 The average is computed for the 1961-85 base period.

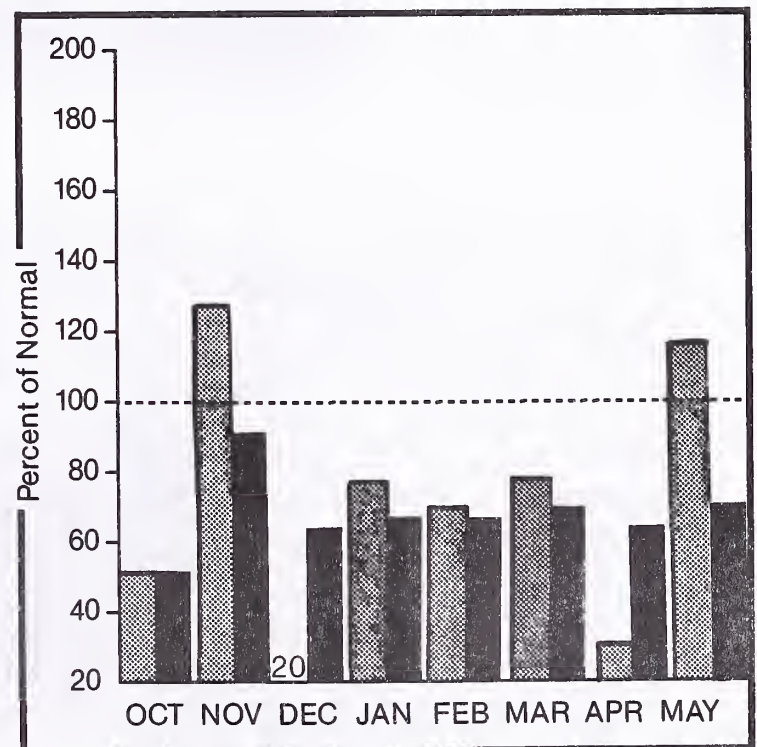
## Jefferson Basin

Mountain snowpack\* (inches)



\* Jefferson

Precipitation\* (percent of normal)



\*Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation



## JEFFERSON RIVER BASIN

### WATER SUPPLY OUTLOOK:

Snowpacks have melted at almost all measuring sites. May was a good mountain precipitation month especially the last two weeks. Precipitation was a little above average across the basin. The southern and eastern part received more rainfall than the northwestern areas. This is the first month since November that mountain precipitation was near average. Streamflows are expected to be nearly the same or a little higher than forecasted on May 1. Runoff for May was below average due in part to the reduced snowmelt contribution. Streams registered increased flows from rains but did not have higher flows than recorded a month ago during peak snowmelt. Irrigation water shortages are still expected to be widespread by mid to late June.

For more information contact your local Soil Conservation Service office.

### JEFFERSON RIVER BASIN

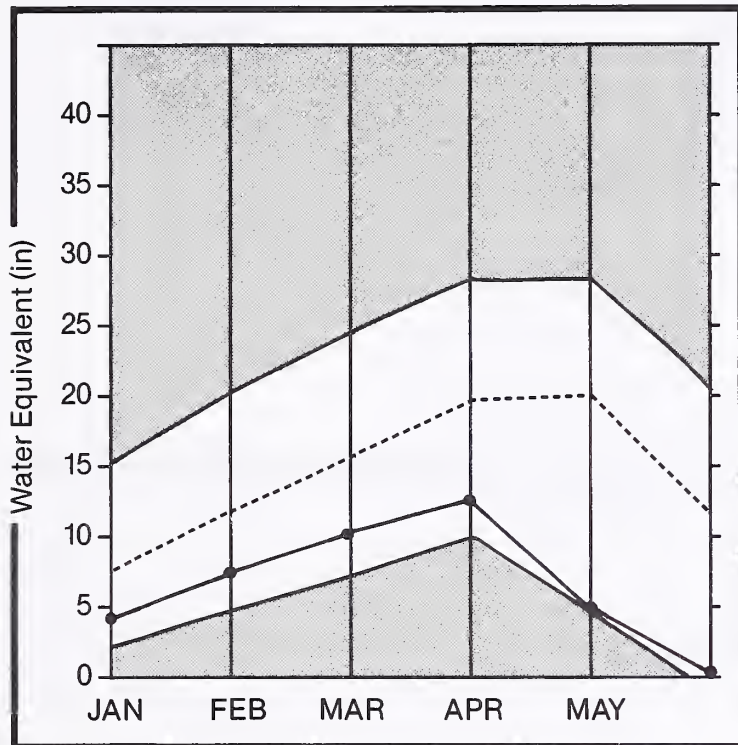
RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
LIMA	84.0	56.6	75.2	67.0	BEAVERHEAD	10	4 3
CLARK CANYON	255.6	154.2	166.1	171.0	RUBY	4	2 2
RUBY RIVER	38.8	32.7	41.3	38.0	BIGHOLE	9	4 3
					BOULDER	4	0 0
					JEFFERSON	20	3 2

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 The average is computed for the 1961-85 base period.



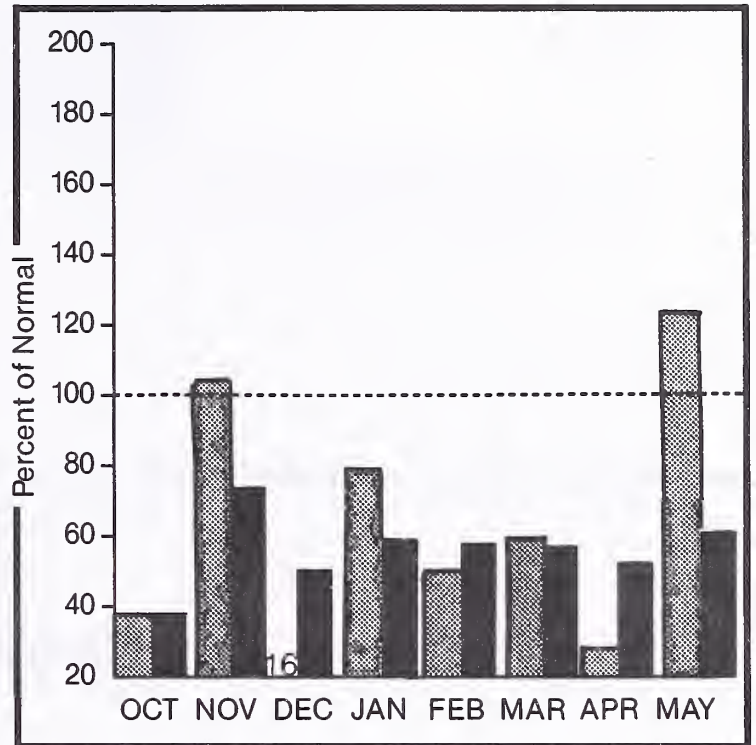
# Madison Basin

**Mountain snowpack\* (inches)**



\*Madison

**Precipitation\* (percent of normal)**

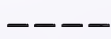


\*Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation



## WATER SUPPLY OUTLOOK:

Some snowfall occurred near the end of May at higher elevations but very little snow remains at measuring sites. Mountain precipitation during May was above average at most sites. Most of it came in the last two weeks. This is the first month since November that precipitation has approached or exceeded average. Streamflows are expected to be about the same as or a little less than forecasted on May 1. Runoff for May was only about two-thirds of average due to the lack of snowmelt runoff. Streamflows generated by rains near the middle of May were higher than those that occurred during snowmelt runoff a month ago. Shortages of irrigation water from smaller tributaries are still expected to develop by late June.

For more information contact your local Soil Conservation Service office.

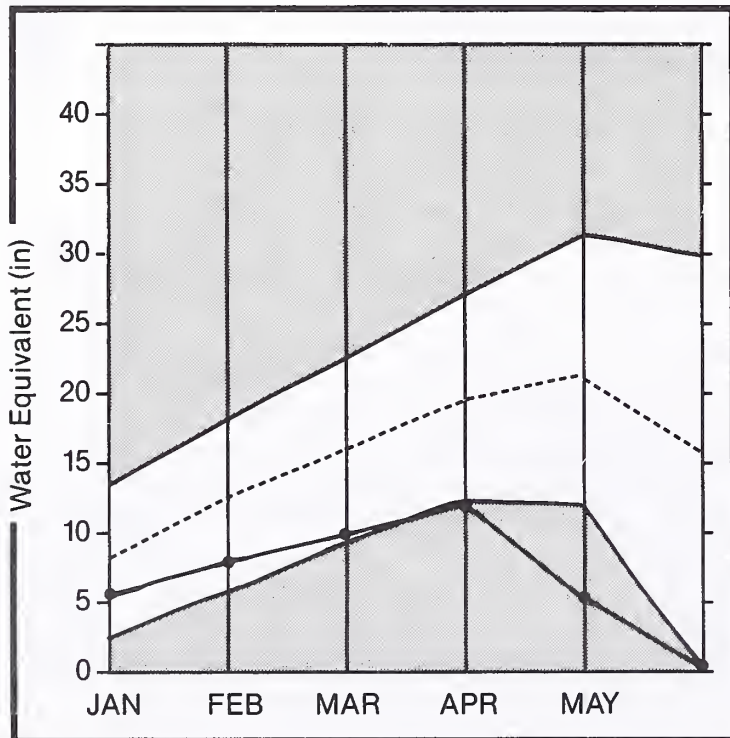
# MADISON RIVER BASIN

RESERVOIR STORAGE					(1000AF)	WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF		
		THIS YEAR	LAST YEAR	AVG.			LAST YR.	AVERAGE	
ENNIS LAKE	41.0	36.0	35.7	35.7	MADISON above HEBGEN	4	0	0	
HEBGEN LAKE	377.5	370.7	338.5	298.3	LOWER MADISON	6	2	1	
					MADISON	10	1	1	

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 2 - Corrected for upstream diversions or changes in reservoir storage.  
 The average is computed for the 1961-85 base period.

## Gallatin Basin

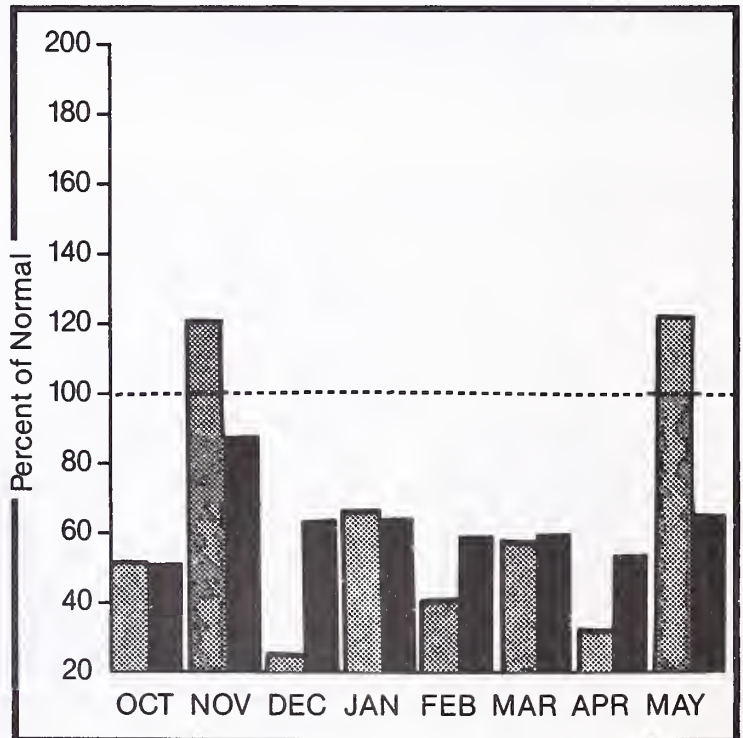
Mountain snowpack\* (inches)



\*Gallatin

Maximum Average   
 Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation



## GALLATIN RIVER BASIN

### WATER SUPPLY OUTLOOK:

Even though some snowfall occurred at higher elevations near the end of May, snow at most measuring sites has melted. Mountain precipitation during May was above average with some sites reporting over 8 inches. Most of this moisture fell in the last two weeks. This is the first month since November to record good moisture. Streamflows are expected to be near the volumes forecast on May 1. The runoff for May was below average as a result of low contribution from snowmelt. Also, some streams picked up flow with the rains. However, the flows did not exceed the peak flows recorded near the first of May during the snowmelt peak. Irrigation water shortages are still expected to become widespread by mid to late June and continue through the summer.

For more information contact your local Soil Conservation Service office.

### GALLATIN RIVER BASIN

RESERVOIR STORAGE					(1000AF)	WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF		
		THIS YEAR	LAST YEAR	AVG.			LAST YR.	AVERAGE	
MIDDLE CREEK	8.0	8.3	8.3	6.8	UPPER GALLATIN	4	1	1	
					EAST GALLATIN	7	3	2	
					GALLATIN	10	2	1	

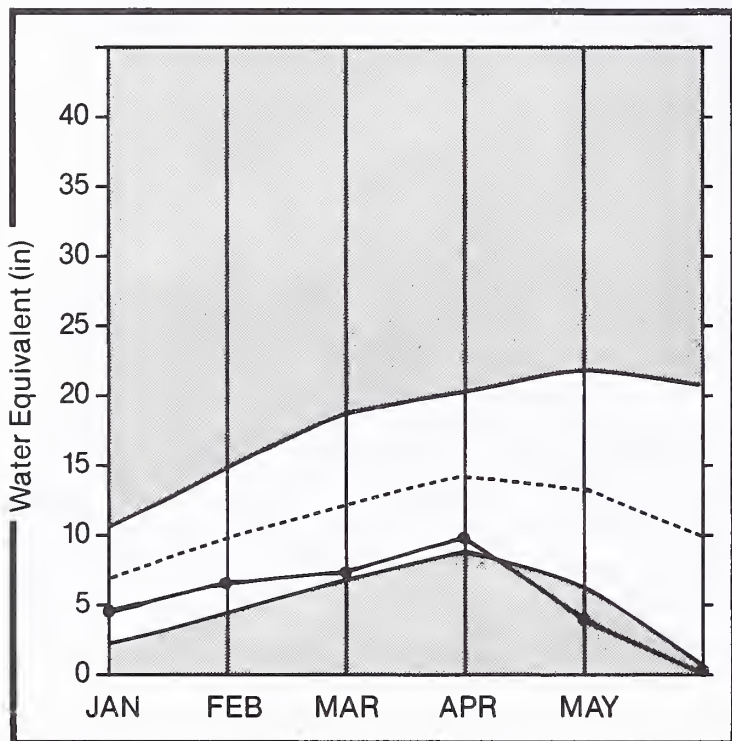
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2 - Corrected for upstream diversions or changes in reservoir storage.

The average is computed for the 1961-85 base period.

# Missouri Basin

**Mountain snowpack\* (inches)**



\*Missouri Toston to Fort Peck

Maximum



Average



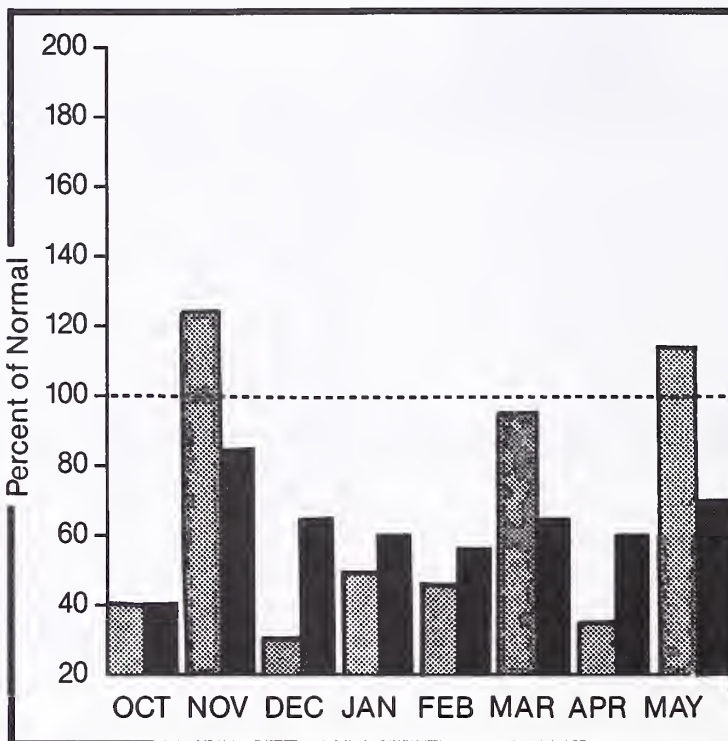
Minimum



Current



**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation



Year to date precipitation



## WATER SUPPLY OUTLOOK:

Nearly all the snow has melted below the elevation of 8000 feet. Mountain precipitation for May was near to above average at most stations. Most of this fell during the last two weeks. Some streams reached their highest flow of the season near the end of May. Streamflow for May was generally below average because of the small snowmelt contribution. Runoff is expected to be near volumes forecasted on May 1. On streams not having reservoir storage, irrigation water shortages are expected to be widespread by mid to late June.

For more information contact your local Soil Conservation Service office.



# MISSOURI RIVER BASIN

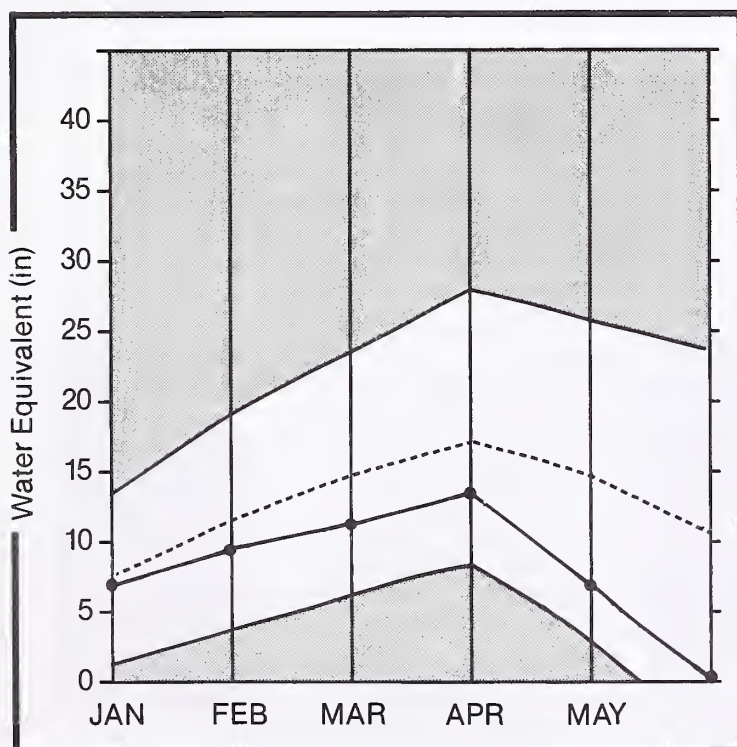
RESERVOIR STORAGE					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF	
		THIS YEAR	LAST YEAR	AVG.			LAST YR.	AVERAGE
CANYON FERRY LAKE	2043.0	1608.0	1649.0	1672.0	MISSOURI HEADWATERS	34	2	2
HELENA VALLEY	9.2	8.3	5.8	7.5	WEST SIDE MISSOURI	4	0	0
LAKE HELENA	10.4	10.7	10.9	10.0	SMITH-BELT	7	2	2
HAUSER & HELENA	61.9	62.5	63.0	60.5	MISSOURI MAINSTEM	11	1	1
HOLTER LAKE	81.9	81.0	79.5	74.9	SUN-TETON-MARIAS	6	2	1
SMITH RIVER	10.6	9.5	11.6	10.8	JUDITH-MUSSELSHELL	8	1	1
NEULAN CREEK	12.4	10.6	12.3	10.6	MISSOURI above FORT PECK	51	2	1
BAIR	7.0	5.4	5.6	6.4	MILK HEADWATERS	2	0	0
MARTINSDALE	23.1	11.4	21.5	17.4	BEAR PAW	5	0	0
DEADMAN'S BASIN	72.2	51.9	54.0	57.4	MILK RIVER	7	0	0
FORT PECK LAKE *	18.9	16.2	15.1	15.7	MISSOURI in MONTANA	57	2	1
					MISSOURI b/w YELLOWSTONE	96	4	4
*Million Acre Feet								

\*Million Acre Feet

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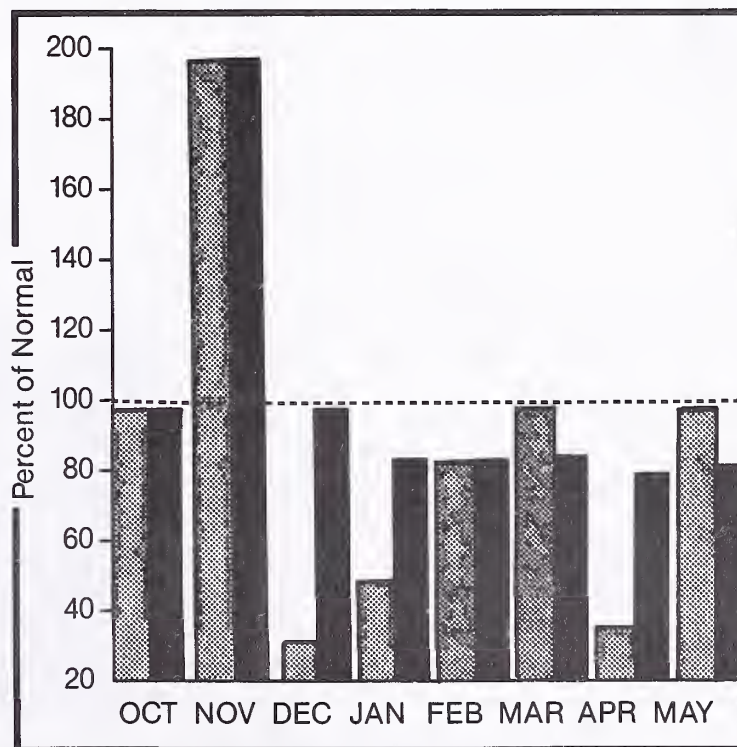
## Sun, Teton and Marias Basins

Mountain snowpack\* (inches)



\*Sun-Teton-Marias

Precipitation\* (percent of normal)



\*Based on selected stations

Maximum

Average

Minimum

Current

Monthly precipitation

Year to date precipitation

## SUN-TETON-MARIAS RIVER BASINS

### WATER SUPPLY OUTLOOK:

Very little snow remains at measuring sites. During May mountain precipitation was near average across the basin with much of it coming over the last two weeks. Streamflows increased with the rains but volume runoff for the month was below average due to the lack of snowmelt runoff. Streamflows are expected to be near or a little less than volumes forecasted on May 1. Shortages in irrigation water on streams not having stored water could develop by mid to late June and continue through the summer.

For more information contact your local Soil Conservation Service office.

## SUN-TETON-MARIAS RIVER BASINS

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	THIS YEAR	LAST YEAR	AUG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
GIBSON	99.1	99.0	88.8	90.2	SUN-TETON	4	0 0
PISHKUN	32.0	31.4	29.5	29.0	MARIAS	2	2 1
WILLOW CREEK	32.2	32.7	31.4	28.0	SUN-TETON-MARIAS	6	2 1
LOWER TWO MEDICINE LAKE	11.9	12.5	---	12.4			
FOUR HORNS LAKE	19.2	13.9	---	13.2			
SHIFT	30.0	30.1	27.9	24.5			
LAKE FRANCES	112.0	104.1	105.3	85.4			
LAKE ELWELL (TIBER)	1347.0	840.1	880.9	662.6			

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.

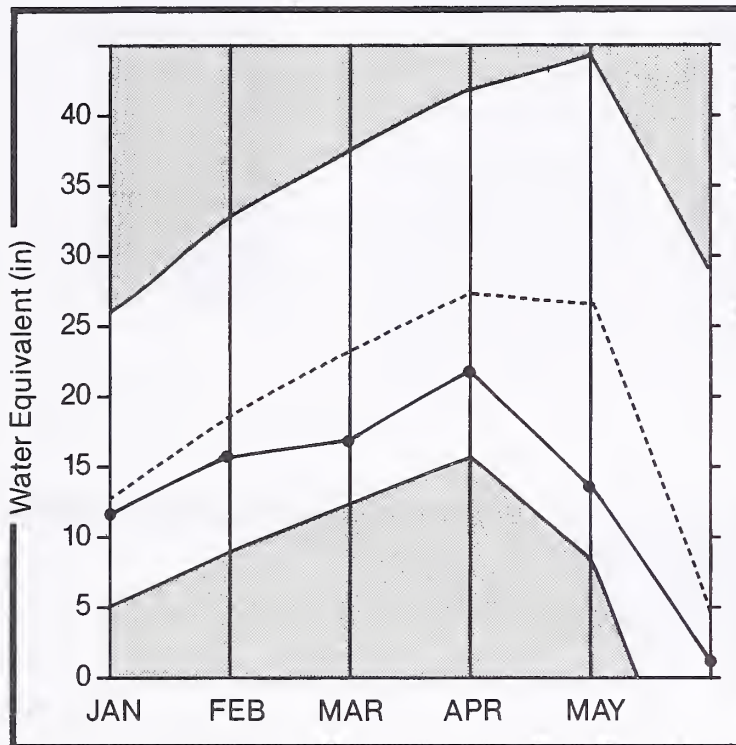
2 - Corrected for upstream diversions or changes in reservoir storage.

The average is computed for the 1961-85 base period.



# St. Mary and Milk Basins

**Mountain snowpack\* (inches)**



\* St. Mary

Maximum



Average



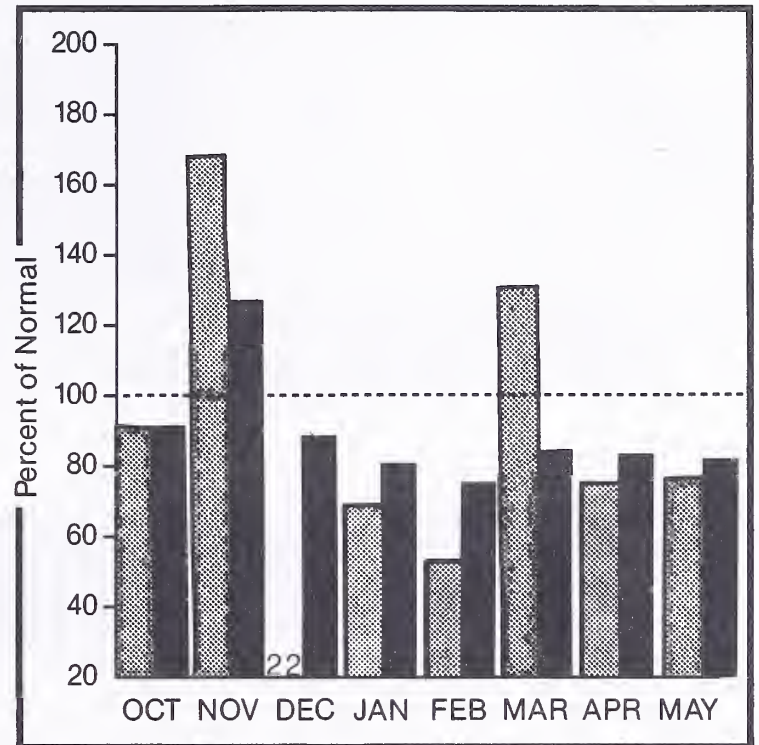
Minimum



Current



**Precipitation\* (percent of normal)**



\*Based on selected stations

Monthly precipitation



Year to date precipitation



## WATER SUPPLY OUTLOOK:

Snowpack remaining in the St. Mary's headwaters is only about 30 percent of average for this date. Precipitation for May was below average in the Bear Paw Mountains and near average in the St. Mary drainage. Runoff for May was about average in the St. Mary River basin. Streamflows are expected to be similar to volumes forecast on May 1. Runoff on the Milk River without the St. Mary Canal is still expected to be well below average.

For more information contact your local Soil Conservation Service office.

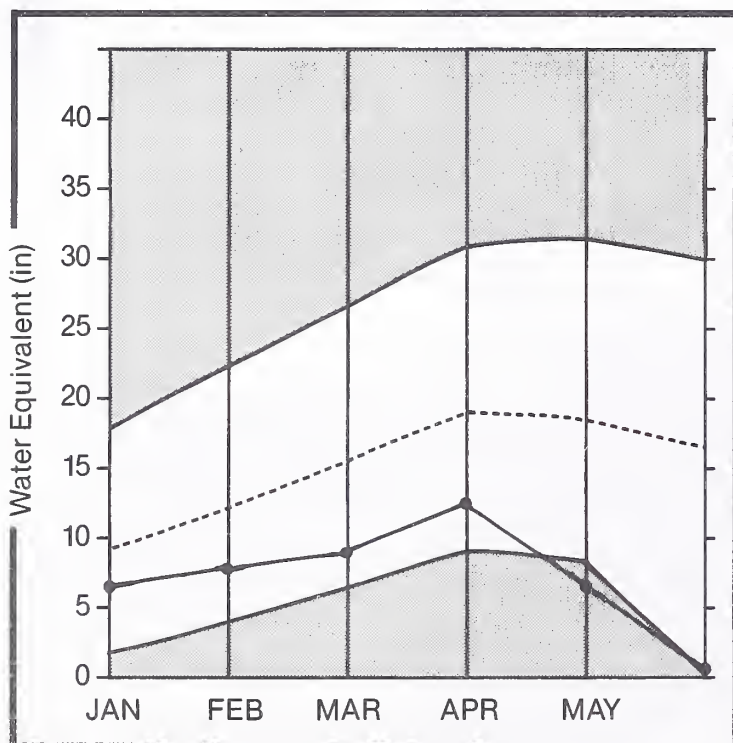
# ST. MARY and MILK RIVER BASINS

RESERVOIR STORAGE					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF	
		THIS YEAR	LAST YEAR	AVG.			LAST YR.	AVERAGE
LAKE SHERBURNE	64.3	64.6	56.8	30.3	MILK HEADWATERS	2	0	0
FRESNO	127.0	92.4	106.1	89.4	BEAR PAW	5	0	0
BEAVER CREEK	3.5	3.3	3.8	3.2	MILK RIVER	7	0	0
NELSON	66.8	57.2	58.4	41.7	ST. MARY	3	43	28
					ST. MARY and MILK	8	43	27
					EDM RIVER in ALBERTA	0	0	0
					OLDMAN RIVER in ALBERTA	0	0	0

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.  
 2 - Corrected for upstream diversions or changes in reservoir storage.  
 The average is computed for the 1961-85 base period.

## Yellowstone Basin

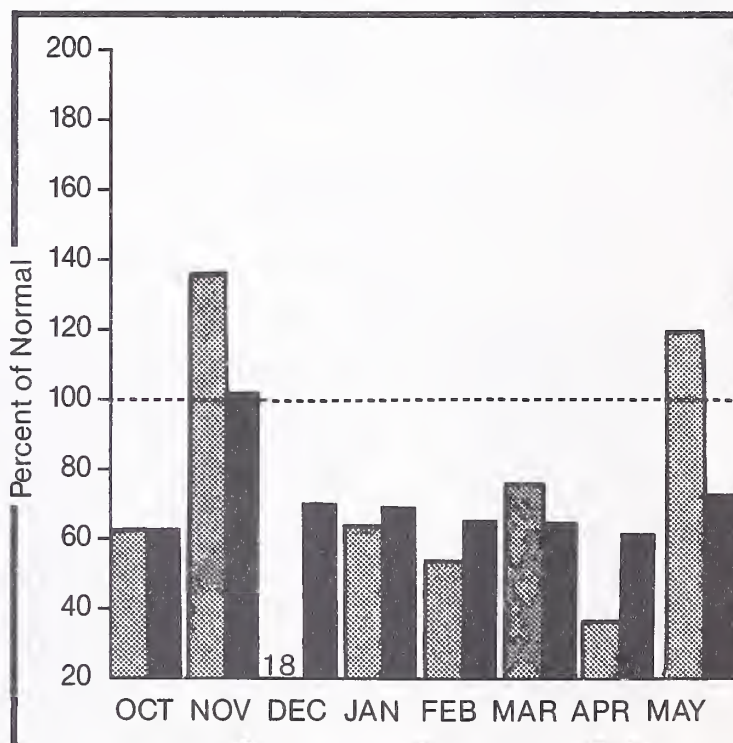
Mountain snowpack\* (inches)



\*Yellowstone above Big Horn

Maximum Average   
 Minimum Current

Precipitation\* (percent of normal)



\*Based on selected stations

Monthly precipitation Year to date precipitation



# YELLOWSTONE RIVER BASIN

## WATER SUPPLY OUTLOOK:

Usually there is a significant amount of snow remaining on June 1. But this year, below 9000 feet it is now almost gone. May precipitation in the mountains was above average for the first time since November. It was well above average in the Red Lodge area. Most of this moisture occurred in the last two weeks of May. Runoff for May was near average in the upper drainages and about 80 percent of average at Billings. Streamflows are expected to be near or a little above those recorded during the snowmelt peak in early May. Shortages of irrigation water supplies are expected to return again near mid to late June and continue through the summer months.

For more information contact your local Soil Conservation Service office.

## YELLOWSTONE RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
MYSTIC LAKE	21.0	12.4	3.7	5.2	YELLOWSTONE ab LIVINGSTON	8	4 4
COONEY	27.4	28.2	24.8	19.1	SHIELDS	6	2 1
BIGHORN LAKE	1356.0	858.4	785.3	749.2	BOULDER-STILLWATER	3	6 5
TONGUE RIVER	68.0	59.8	42.0	47.7	CLARK'S FORK-ROCK CREEK	12	5 6
					YELLOWSTONE above BIGHORN	23	3 2
					LITTLE BIGHORN	2	6 5
					WIND RIVER (Wyoming)	11	9 14
					BIGHORN RIVER (Wyoming)	16	7 8
					BIGHORN BASIN (Total)	24	10 12
					TONGUE RIVER (Wyoming)	6	4 3
					POWDER RIVER (Wyoming)	7	0 0
					YELLOWSTONE RIVER	48	6 6

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.

2 - Corrected for upstream diversions or changes in reservoir storage.

The average is computed for the 1961-85 base period.

# Snow Data Measurements

May 15, 1987

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA							NEVADA CREEK FILL	6480	5/15/87	---	.0	3.5	11.4
BADGER PASS FILL	6900	5/15/87	---	8.0	35.1	36.9	NEZ PERCE CMP FILL	5650	5/15/87	---	.0	6.1	5.3
BANFIELD MTN FILL	5600	5/15/87	---	.0	9.7	13.1	NOISY BASIN FILL	6040	5/15/87	---	14.2	41.3	43.0
BANFIELD MOUNTAIN	5600	5/15/87	0	.0	7.6	15.4	N.F. ELK CR FILL	6250	5/15/87	---	.0	2.6	6.8
BAREE CREEK	5500	5/14/87	18	9.4	18.9	39.0	NORTH FORK JOCKO	6330	5/14/87	8	4.3	32.5	41.5
BAREE MIDWAY	4600	5/14/87	6	2.6	8.3	22.5	N.E. ENTRANCE FILL	7350	5/15/87	---	.0	.0	2.9
BAREE TRAIL	3800	5/14/87	0	.0	.0	.0	NORTHEAST ENTRANCE	7350	5/15/87	0	.0	--	4.1
BARKER LAKES FILL	8250	5/15/87	---	.0	20.8	15.8	PICKET PIN O	9450	5/16/87	4	1.5	24.5	28.5
BASIN CREEK FILL	7180	5/15/87	---	.0	11.9	9.6	PICKFOOT CRK FILL	6650	5/15/87	---	.0	2.0	3.1
BEAGLE SPGS FILL	8850	5/15/87	---	.0	14.1	4.9	PIKE CREEK FILL	5930	5/15/87	---	.0	16.6	20.6
BEAR PAW SKI AREA	5200	5/12/87	0	.0	2.0	--	PLACER BASIN F	8830	5/10/87	3	1.0	20.0	22.9
BEAVER CREEK FILL	7850	5/15/87	---	.0	24.1	21.7	PLACER BASIN FILL	8830	5/15/87	---	5.5	20.9	20.1
BLACK BEAR FILL	7950	5/15/87	---	.3	49.1	35.9	POORMAN CRK FILL	5100	5/15/87	---	.0	11.1	22.6
BLACK PINE FILL	7100	5/15/87	---	.0	8.5	10.8	POORMAN CREEK	5100	5/15/87	0	.0	13.4	23.2
BLACK PINE	7100	5/15/87	0	.0	--	10.1	PORCUPINE FILL	6500	5/15/87	---	.0	.0	.4
BLOODY DICK FILL	7550	5/15/87	---	.0	11.2	6.4	RED MOUNTAIN	6000	5/13/87	0	.0	6.4	14.2
BOTS SOTS	7750	5/15/87	0	.0	2.2	7.5	ROCKER PEAK FILL	8000	5/15/87	---	2.9	21.3	18.3
BOULDER MTN FILL	7950	5/15/87	---	.0	23.4	21.0	ROCKY BOY	4700	5/12/87	0	.0	.8	.7
BOX CANYON FILL	6700	5/15/87	---	.0	.0	1.5	ROCKY BOY FILL	4700	5/12/87	0	.0	.8	1.0
BOXELDER CREEK	5100	5/12/87	0	.0	1.5	--	SADDLE MTN FILL	7900	5/15/87	---	.0	27.1	26.8
BRIDGER BOWL FILL	7250	5/14/87	---	.0	20.5	26.7	SHOWER FALLS FILL	8100	5/15/87	---	3.2	29.4	29.2
BRIDGER BOWL	7250	5/14/87	0	.0	20.6	28.7	SILVER RUN	6630	5/15/87	0	.0	.0	2.3
CALVERT CREEK FILL	6430	5/15/87	---	.0	.0	.1	SILVER RUN FILL	6630	5/15/87	---	.0	.0	.0
CAMP SENIA	7890	5/15/87	0	.0	4.6	9.4	SKALKAHO FILL	7260	5/15/87	---	2.1	27.4	24.2
CARROT BASIN FILL	9000	5/15/87	---	3.0	37.3	31.9	SKYLARK TRAIL FILL	6200	5/15/87	---	.0	23.3	29.7
CASHE CREEK FILL	7800	5/15/87	---	.0	9.5	8.1	S.F. SHIELOS FILL	8100	5/15/87	---	.0	19.6	20.9
CLOVER MEADOW FILL	8800	5/15/87	---	.0	23.1	17.4	SPUR PARK FILL	8100	5/15/87	---	.5	27.6	22.7
COLE CREEK FILL	7850	5/15/87	---	2.0	24.2	20.2	STAHL PEAK	6030	5/15/87	48	25.1	33.7	39.8
COMBINATION	5600	5/15/87	0	.0	--	1.3	STAHL PEAK FILL	6030	5/15/87	---	27.1	35.5	39.8
COMBINATION FILL	5600	5/15/87	---	.0	.0	.5	STAR LAKE E	9650	5/10/87	28	12.5	46.0	49.1
COPPER BOTTOM FILL	5200	5/15/87	---	.0	.0	1.4	SUCKER CREEK	3960	5/12/87	0	.0	.0	--
COPPER CAMP FILL	6950	5/15/87	---	.0	23.1	28.1	TAYLOR ROAD	4080	5/12/87	0	.0	.0	--
COPPER MOUNTAIN	7700	5/12/87	0	.0	7.6	8.6	TEPEE CREEK FILL	8000	5/15/87	---	.0	16.8	12.2
CRYSTAL LAKE FILL	6050	5/15/87	---	.0	5.1	8.7	TIMBERLINE CREEK	8850	5/15/87	0	.0	18.0	18.2
DALY CREEK FILL	5780	5/15/87	---	.0	.1	2.3	TWELVEMILE FILL	5600	5/15/87	---	.0	.3	6.6
DARKHORSE LK. FILL	8700	5/15/87	---	5.2	33.9	28.2	TWIN LAKES FILL	6400	5/15/87	---	8.4	32.2	38.9
DEADMAN CREEK FILL	6450	5/15/87	---	.0	.0	2.8	WALDRON FILL	5600	5/15/87	---	.0	.0	2.9
DISCOVERY BASIN	7050	5/15/87	0	.0	8.2	8.8	WARM SPRINGS FILL	7800	5/15/87	---	4.8	28.6	31.5
DIVIDE FILL	7800	5/15/87	---	.0	14.8	8.7	WEASEL DIVIDE	5450	5/15/87	20	9.9	16.8	30.6
DUPUYER CREEK FILL	5750	5/15/87	---	.0	.1	1.0	WEST YELL'ST FILL	6700	5/15/87	---	.0	.0	1.6
EAST BOULDER S	9250	5/10/87	12	5.0	32.0	33.1	WEST YELLOWSTONE	6700	5/15/87	0	.0	--	--
EMERY CREEK FILL	4350	5/15/87	---	.0	.0	1.6	WHISKEY CREEK FILL	6800	5/15/87	---	.0	18.4	10.0
FISHER CREEK FILL	9100	5/15/87	---	7.6	41.8	38.8	WHITE MILL FILL	8700	5/15/87	---	2.0	31.4	26.2
FLATTOP MTN FILL	6300	5/15/87	---	25.4	40.3	46.7	WOOD CREEK FILL	5960	5/15/87	---	.0	4.6	4.1
FROHNER MOWS FILL	6480	5/15/87	---	.0	5.7	6.3							
GARVER CREEK FILL	4250	5/15/87	---	.0	.0	.2							
GARVER CREEK	4250	5/15/87	0	.0	.0	.3							
GIBBONS PASS	7100	5/15/87	0	.0	17.7	18.9							
GRAVE CRK FILL	4300	5/15/87	---	.0	.0	2.6							
GRAVE CREEK	4300	5/15/87	0	.0	.0	7.1							
HAND CREEK FILL	5030	5/15/87	---	.0	2.9	3.4							
HAWKINS LAKE FILL	6450	5/15/87	---	8.8	31.0	28.4							
HAWKINS LAKE	6450	5/15/87	17	8.2	27.1	29.4							
HEART LAKE TRAIL	4800	5/16/87	0	.0	6.0	10.7							
HELL ROARING DIVIDE	5770	5/14/87	17	7.6	20.0	24.8							
HOODOO BASIN FILL	6050	5/15/87	---	17.0	39.3	44.0							
HOODOO BASIN	6050	5/16/87	26	15.0	44.5	48.7							
HOODOO CREEK	5900	5/16/87	24	12.7	36.0	45.1							
INTERGAARD	6450	5/12/87	0	.0	6.3	5.8							
KINGS HILL	7500	5/13/87	0	.0	15.5	14.7							
KIWANIS CAMP	3720	5/12/87	0	.0	.0	--							
KRAFT CREEK FILL	4750	5/15/87	---	.0	.0	1.4							
LAKEVIEW ROG. FILL	7400	5/15/87	---	.0	9.3	5.1							
LEMHI RIDGE FILL	8100	5/15/87	---	.0	14.2	8.1							
LICK CREEK FILL	6860	5/15/87	---	.0	2.0	4.9							
LOWER TWIN FILL	7900	5/15/87	---	.3	23.8	22.3							
LUEBECHT FILL	4680	5/15/87	---	.0	.0	.0							
MANY GLACIER FILL	4900	5/15/87	---	.0	.0	1.1							
MAYNARD CREEK	6210	5/14/87	0	.0	4.0	12.0							
MAYNARD CREEK FILL	6210	5/14/87	---	.0	5.8	10.9							
MONUMENT PEAK FILL	8850	5/15/87	---	1.6	27.6	24.4							
MOSS PEAK FILL	6780	5/15/87	---	15.4	43.4	44.3							
MT LOCKHART FILL	6400	5/15/87	---	.2	19.7	20.4							
MULE CREEK FILL	8300	5/15/87	---	1.2	10.5	16.1							



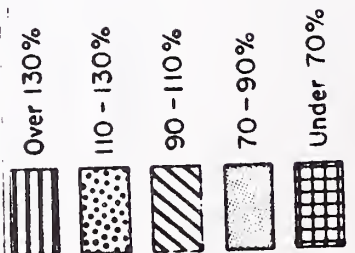
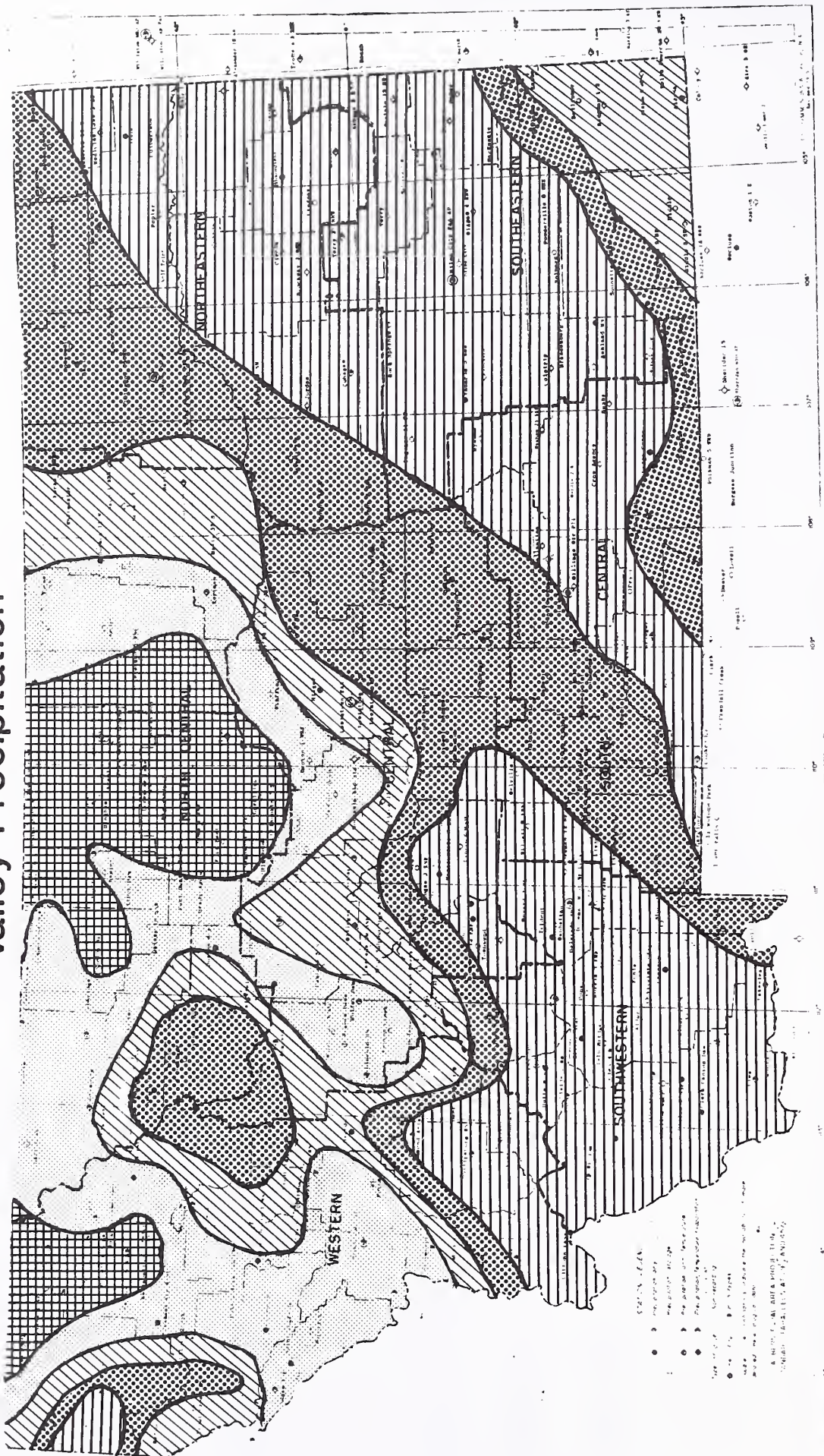
# Snow Data Measurements

June 1, 1987

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA							NEVADA CREEK FILL	6480	6/01/87	---	.0	.0	6.5
BAOGER PASS FILL	6900	6/01/87	---	.4	16.3	22.8	NEZ PERCE CMP FILL	5650	6/01/87	---	.0	.0	.3
BANFIELD MTN FILL	5600	5/30/87	---	.0	.0	3.3	NEZ PERCE CAMP	5650	5/30/87	0	.0	.0	--
BANFIELD MOUNTAIN	5600	5/30/87	0	.0	.0	6.2	NEZ PERCE CREEK	6600	5/30/87	0	.0	--	--
BARKER LAKES FILL	8250	6/01/87	---	.3	9.3	10.1	NOISY BASIN	6040	5/30/87	17	8.8	34.3	43.2
BASIN CREEK FILL	7180	6/01/87	---	.0	4.3	6.0	NOISY BASIN FILL	6040	6/01/87	---	3.3	29.0	31.4
BEAGLE SPGS FILL	8850	6/01/87	---	.0	.0	1.1	N.F. ELK CR FILL	6250	6/01/87	---	.0	.0	3.5
BEAR PAW SKI AREA	5200	5/28/87	0	.0	.0	1.0	N.F. ELK CREEK	6250	6/02/87	0	.0	--	2.4
BEAVER CREEK FILL	7850	6/01/87	---	.0	13.1	18.1	NORTH FORK JOCKO	6330	5/28/87	1	.7	8.6	28.4
BIG CREEK	6750	5/29/87	22	11.3	37.4	43.7	N.E. ENTRANCE FILL	7350	6/01/87	---	.0	.0	.0
BLACK BEAR FILL	7950	6/01/87	---	.0	37.5	26.1	NORTHEAST ENTRANCE	7350	6/02/87	0	.0	--	.5
BLACK PINE FILL	7100	6/01/87	---	.0	.0	3.4	PETERSON MOW FILL	7200	6/03/87	---	.0	--	4.3
BLACK PINE	7100	5/27/87	0	.0	.0	3.9	PETERSON MEADOWS	7200	6/03/87	0	.0	--	1.3
BLOODY OICK FILL	7550	6/01/87	---	.0	.0	1.0	PICKFOOT CRK FILL	6650	6/01/87	---	.0	.0	.0
BOULDER MTN FILL	7950	6/01/87	---	.5	8.8	11.6	PIKE CREEK	5930	5/26/87	0	.0	.0	--
BOX CANYON FILL	6700	6/01/87	---	.0	.0	.0	PIKE CREEK FILL	5930	6/01/87	---	.0	.0	12.6
BOXELDER CREEK	5100	5/28/87	0	.0	.0	--	PLACER BASIN FILL	8830	6/01/87	---	1.7	14.1	16.2
BRIODGER BOWL FILL	7250	6/01/87	---	.1	10.6	17.4	POORMAN CRK FILL	5100	5/30/87	---	.0	.0	12.0
BRIODGER BOWL	7250	6/01/87	3	.4	13.0	21.0	POORMAN CREEK	5100	5/30/87	0	.0	.0	10.2
CALVERT CR FILL	6430	6/01/87	---	.0	.0	.0	POPCUPINE FILL	6500	6/01/87	---	.0	.0	.0
CARROT BASIN FILL	9000	6/01/87	---	.2	27.4	26.6	RED MOUNTAIN	6000	6/01/87	0	.0	.0	4.7
CASHE CREEK FILL	7800	6/01/87	---	.2	.0	4.2	ROCKER PEAK	8000	5/28/87	0	.0	6.3	9.1
CHICKEN CREEK	4060	5/26/87	0	.0	--	.0	ROCKER PEAK FILL	8000	6/01/87	---	.0	11.3	14.4
CLOVER MOW FILL	8800	6/01/87	---	.0	14.2	11.1	ROCKY BOY	4700	5/28/87	0	.0	.0	.4
COLE CREEK	7850	5/28/87	0	.0	15.4	19.6	ROCKY BOY FILL	4700	5/28/87	---	.0	.0	.3
COLE CREEK FILL	7850	6/01/87	---	.0	13.2	14.3	SADDLE MTN FILL	7900	6/01/87	---	.0	14.8	19.8
COMBINATION	5600	5/27/87	0	.0	.0	.3	SHOWER FALLS FILL	8100	6/01/87	---	.4	17.9	23.7
COMBINATION FILL	5600	6/01/87	---	.0	.0	.0	SILVER RUN	6630	5/28/87	0	.0	.0	.9
COPPER BOTTOM FILL	5200	6/01/87	---	.0	.0	.1	SILVER RUN FILL	6630	6/01/87	---	.0	.0	.0
COPPER CAMP FILL	6950	6/01/87	---	.0	.6	13.7	SKALKAHU FILL	7260	6/01/87	---	.0	15.8	16.2
CRYSTAL LAKE FILL	6050	6/01/87	---	.0	.0	1.0	SKALKAHU SUMMIT	7250	5/28/87	0	.0	8.7	15.6
DALY CREEK	5780	5/28/87	0	.0	--	--	SKYLARK TRAIL FILL	6200	6/01/87	---	.0	1.7	16.5
DALY CREEK FILL	5780	6/01/87	---	.0	.0	.0	S.F. SHIELDS FILL	8100	6/01/87	---	.0	8.7	15.6
DARKHORSE LK. FILL	8700	6/01/87	---	1.9	24.4	24.4	SPUR PARK FILL	8100	6/01/87	---	.3	16.6	16.5
DEADMAN CR FILL	6450	6/01/87	---	.0	.0	.1	SPUR PARK	8100	5/27/87	1	.2	21.4	17.5
DEADMAN CREEK	6450	5/27/87	0	.0	.0	.4	STAHL PEAK	6030	5/30/87	23	12.7	32.8	32.5
DISCOVERY BASIN	7050	5/27/87	0	.0	--	5.7	STAHL PEAK FILL	6030	6/01/87	---	16.0	25.2	29.9
DIVIDE FILL	7800	6/01/87	---	.0	2.0	1.9	STRYKER BASIN	6180	5/26/87	10	5.7	17.9	21.1
DUPUYER CREEK FILL	5750	6/01/87	---	.0	.0	.0	SUCKER CREEK	3960	5/28/87	0	.0	.0	.2
EMERY CREEK	4350	5/30/87	0	.0	.0	.0	TAYLOR ROAD	4080	5/28/87	0	.0	.0	.5
EMERY CREEK FILL	4350	6/01/87	---	.0	.0	.0	TEPEE CREEK FILL	8000	6/01/87	---	.0	5.5	5.6
FISHER CREEK FILL	9100	6/01/87	---	.4	33.5	33.3	THELVEMILE FILL	5600	6/01/87	---	.0	.0	.6
FLATTOP MTN FILL	6300	6/01/87	---	14.4	33.5	38.7	TWIN LAKES FILL	6400	6/01/87	---	.3	18.2	28.6
FROHNER MOWS FILL	6480	6/01/87	---	.0	.0	1.8	WALORON FILL	5600	6/01/87	---	.0	.0	.1
GARVER CREEK FILL	4250	5/30/87	---	.0	.0	.0	WARM SPRINGS	7800	6/02/87	0	.0	--	12.7
GARVER CREEK	4250	5/30/87	0	.0	.0	.0	WARM SPRINGS FILL	7800	6/01/87	---	.0	20.0	25.7
GIBBONS PASS	7100	6/02/87	0	.0	.2	9.8	WEASEL DIVIDE	5450	5/30/87	0	.0	10.2	19.3
GRAVE CRK FILL	4300	6/01/87	---	.0	.0	.0	WEST YELL' ST FILL	6700	6/02/87	---	.0	.0	.0
GRAVE CREEK	4300	5/30/87	0	.0	.0	1.4	WEST YELLOWSTONE	6700	6/02/87	0	.0	.0	--
HAND CREEK	5030	5/28/87	0	.0	.0	.0	WHISKEY CREEK FILL	6800	6/01/87	---	.0	1.6	1.2
HAND CREEK FILL	5030	6/01/87	---	.0	.0	.0	WHITE HILL FILL	8700	6/01/87	---	.0	23.8	19.9
HANKINS LAKE FILL	6450	5/30/87	---	.0	15.8	20.4	WOOD CREEK FILL	5960	6/01/87	---	.0	.0	.0
HANKINS LAKE	6450	5/30/87	0	.0	20.2	20.6							
HEART LAKE TRAIL	4800	5/31/87	0	.0	.0	2.7							
HELL ROARING DIVIDE	5770	5/28/87	0	.0	.4	12.7							
HERRIG JUNCTION	4850	5/26/87	0	.0	.0	2.3							
HOODOO BASIN FILL	6050	6/01/87	---	6.5	19.9	30.7							
HOODOO BASIN	6050	5/31/87	9	4.5	17.2	35.0							
HOODOO CREEK	5900	5/31/87	6	2.8	15.8	34.7							
KINGS HILL	7500	5/27/87	0	.0	10.0	9.7							
KIWANIS CAMP	3720	5/28/87	0	.0	.0	--							
KRAFT CREEK FILL	4750	6/01/87	---	.0	.0	.0							
LAKEVIEW RDG. FILL	7400	6/01/87	---	.3	.0	.0							
LEMHI RIDGE FILL	8100	6/01/87	---	.0	.0	4.2							
LICK CREEK FILL	6860	6/01/87	---	.0	.0	.5							
LICK CREEK	6860	6/01/87	2	.3	.0	1.3							
LOWER TWIN FILL	7900	6/01/87	---	.8	13.6	15.2							
LUEBRECHT FLUME	4680	6/02/87	0	.0	--	--							
LUEBRECHT FILL	4680	6/01/87	---	.0	.0	.0							
MANY GLACIER	4900	6/02/87	0	.0	--	--							
MANY GLACIER FILL	4900	6/01/87	---	.0	.0	.0							
MAYNARD CREEK	6210	6/01/87	0	.0	.0	3.9							
MAYNARD CR FILL	6210	6/01/87	---	.0	.0	4.0							
MONUMENT PK FILL	8850	6/01/87	---	.1	16.6	16.6							
MOSS PEAK	6780	5/29/87	20	10.6	29.8	--							
MOSS PEAK FILL	6780	6/01/87	---	4.8	31.1	32.3							
MT LOCKHART FILL	6400	6/01/87	---	.0	4.9	11.1							
MULE CREEK FILL	8300	6/01/87	---	.0	.0	11.3							



# Valley Precipitation



Source: NWS  
Great Falls, MT

MAY 1987



# The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

## Canadian

Department of the Environment  
Atmospheric Environment Service  
Water Management Service  
British Columbia Ministry of Environment  
Inventory and Engineering Branch, Hydrology Section  
Alberta Environment  
Technical Services Division

## Federal

U.S. Department of Agriculture  
Forest Service  
U.S. Department of the Army  
Corps of Engineers  
U.S. Department of Commerce  
NOAA, National Weather Service  
National Environmental Satellite Service  
U.S. Department of the Interior  
Bureau of Indian Affairs  
Fish and Wildlife Service  
Geological Survey  
National Park Service  
Bureau of Reclamation  
U.S. Department of Energy  
Bonneville Power Administration

## State

Montana Conservation Districts  
Montana Department of Fish, Wildlife, and Parks  
Montana Department of Natural Resources and Conservation  
Montana Department of State Lands  
Montana State University - Agricultural Experiment Station  
University of Montana - School of Forestry

## Private

Big Sky of Montana  
Butte Water Company  
Confederated Salish & Kootenai Tribes  
Flathead Valley Community College  
Montana Power Company  
Pondera County Canal & Reservoir Company

Other organizations and individuals furnish information for the snow survey reports.

Their cooperation is gratefully acknowledged.

**UNITED STATES DEPARTMENT OF AGRICULTURE**

**SOIL CONSERVATION SERVICE**

**SNOW SURVEY UNIT**

**Federal Bldg., Rm. 443  
10 East Babcock Street  
Bozeman, MT 59715**

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